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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,096	07/16/2003	Robert B. Ford	02022 (3600-394-01)	9273

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EXAMINER	
MCDONALD, RODNEY GLENN	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,096	FORD ET AL.	
	Examiner	Art Unit	
	Rodney G. McDonald	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-19,21-28,32 and 34-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-19,21-28,32 and 34-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 5, 6, 8-16, 18, 19, 21, 23 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segal et al. (U.S. Pat. 6,878,250) in view of Raaijmakers et al. (U.S. Pat. 6,340,415).

Regarding claim 1, Segal et al. teach a monolithic sputter target assembly (Column 4 lines 42-45) being of a one piece assembly with a sputtering target blank portion and a backing plate portion (See Fig. 3A; Compare to Applicant's Figures 1-3). The sputtering target can have an annealed upper surface and a remaining portion that it unannealed. (Column 14 lines 18-20; Column 4 lines 56-65) Annealing as noted by

Segal at causes the activation of different metallurgical and physical mechanisms such as second-phase particle growth and coalescence, recovery and static recrystallization. (Column 5 lines 43-58) Thus applicant's front surface inherently has a recrystallized front surface because of the annealing and the back surface being not recrystallized because it is unannealed. (Column 14 lines 18-20)

Regarding claim 2, Segal et al. teach that the target can be Ta. (Column 1 line 39)

Regarding claim 5, Segal et al. teach that the target can be Ti. (Column 1 line 39)

Regarding claim 6, Segal et al. teach that the target can be a valve metal. (Column 1 lines 39-40)

Regarding claims 8, 9, 10, Segal et al. teach a monolithic sputter target assembly (Column 4 lines 42-45) being of a one piece assembly with a sputtering target blank portion and a backing plate portion. The backing portion can comprise a flange portion. (See Fig. 3A; Compare to Applicant's Figures 1-3). Regarding the flange portion having a high yield strength and/or is more rigid than the sputtering target blank portion, the flange portion has a higher yield strength and/or is more rigid because the flange portion has not been annealed and therefore it not fully recrystallized. Applicant has pointed the relationship between process for producing the target and result of the process on the flange portion in their specification at Page 9 lines 5-18. Segal et al. specifically discusses that the sputtering target can have an annealed upper surface and a remaining portion that it unannealed which would include the flange portion. (Column

14 lines 18-20; Column 4 lines 56-65) Annealing as noted by Segal at causes the activation of different metallurgical and physical mechanisms such as second-phase particle growth and coalescence, recovery and static recrystallization. (Column 5 lines 43-58) Thus applicant's front surface inherently has a recrystallized front surface because of the annealing and the back surface including the flange being not recrystallized because it is unannealed. (Column 14 lines 18-20)

Regarding claims 11 and 16, Segal et al. discussed above already establish a monolithic sputtering target assembly comprising a one piece assembly made from the same metal where the one piece assembly comprises a sputtering target blank portion and a backing plate portion. The flange portion having a high yield strength and/or is more rigid than the sputtering target blank portion has also been discussed and is direct result of the annealing processing applied to the front of the target for recrystallization and for the non annealed back portion. (See Segal et al. discussed above) Segal et al. also teach that the surface of the target may have a uniform texture at any location. (Column 1 lines 30-40) Segal et al. also recognizes that the surface can have a texture of (111). (See Tables; Column 12 lines 44-46)

Regarding claim 12, Segal et al. teach that the sputtering target can have a purity of 99.5%. (Column 2 lines 10-12)

Regarding claims 13-15, Segal et al. teach that the grain size can be less than 1 micron.

Regarding claim 18, Segal et al. teach that the target can have a mixed (111) throughout the metal. (See Tables; Column 12 lines 44-46)

Regarding claim 19, Segal et al. already discussed teaches a sputtering target assembly with a backing plate and a sputtering target blank where the backing plate and the sputtering target blank comprise the same metal and the metal can be a valve metal (i.e. Ta or alloys) or titanium. (See Segal et al. discussed above)

Regarding claim 21, Segal et al. teach that the sputtering target blank and backing plate are tantalum. (See Segal et al. discussed above; Column 1 lines 39-40)

Regarding claim 23, Segal et al. teach that the sputtering target blank and the backing plate are titanium. (See Segal et al. discussed above; Column 1 lines 39-40)

Regarding claim 35, Segal et al. teach that the metal can be ingot derived. (Column 2 line 65)

The difference between the present claims and Segal et al. is that the heat sink configuration on an underneath side f the monolithic sputtering target assembly is not discussed.

Raaijmakers et al. teach that a on the back of a target a plurality of grooves can be provided for providing cooling. (Column 3 lines 52-68; Column 4 lines 1-6)

The motivation for utilizing grooves on the back of a sputtering target is that it allows for providing cooling to the target. (Column 3 lines 52-68; Column 4 lines 1-6)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Segal et al. by utilizing a heat sink configuration as taught by Raaijmakers et al. because it allows for cooling the target.

Claims 3, 22, 25, 27, 28, 32, 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segal et al in view of Raaijmakers et al. as applied to claims 1,

2, 5, 6, 8-16, 18, 19, 21, 23 and 35 above, and further in view of Aimone et al. (U.S. PGPUB. 2002/0112955).

The differences not yet discussed is that the metal of the target being niobium is not discussed (Claims 3, 22), the recycling of the target is not discussed (Claim 25, 32), the filling of the cavities in the spent monolithic target is not discussed (Claim 27), redepositing metal on the spent monolithic sputtering target to form a new target is not discussed (Claim 28), where the metal is consolidated metal powder is not discussed (Claim 34), where the target comprises a portion of consolidated metal powder and a portion of ingot derived metal (claim 36).

Regarding claims 3, 22, Segal et al. discussed above teach at Column 1 lines 10-14 that high purity metals and alloys can be used as sputter targets. High purity metals include niobium. Furthermore, Aimone et al. at Page 1 [0003] recognize that Nb can be used as a sputter target.

The motivation for utilizing a niobium target is that it allows for producing optical, electrical and magnetic product manufacture. (Aimone et al. [0003])

Regarding claims 25, 32, Aimone et al. teach that a sputtered target can be recycled by filling zones of erosion with metal powder and melting to recycle the target. (See Aimone et al. Abstract)

Regarding claim 27, Aimone et al. teach filling cavities of a target for recycling the target material. (See Aimone et al. Abstract)

Regarding claim 28, Aimone teach redepositing a metal powder onto the sputter target to form a new target. (See Aimone et al. Abstract)

Regarding claim 34, Aimone et al. teach that the target can be comprised of metal powder. (See Aimone et al. Abstract)

Regarding claim 36, Segal et al. teach utilizing a target of derived ingot metal. (See Segal et al. discussed above) Aimone et al. suggest using metal powder to replace eroded regions of a target. (See Aimone et al. discussed above) Therefore the references of Segal et al. and Aimone et al. taken as a whole suggest an ingot derived and metal powder target.

The motivation for recycling a metal target is that it allows for decreasing cost of sputter targets. (See Aimone et al. [0002])

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a refractory target, recycling a target and to have a target derived from powder as taught by Aimone et al. because it allows for forming electronic products and decreasing cost of sputtering targets.

Claims 4 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segal et al in view of Raaijmakers et al. as applied to claims 1, 2, 5, 6, 8-16, 18, 19, 21, 23 and 35 above, and further in view of Holcomb et al. (U.S. PGPUB. 2002/0134675).

The difference not yet discussed is the metal of the target being cobalt (Claims 4, 24).

Regarding claims 4 and 24, Segal et al. already establish that high purity metals can be used for targets. (See Segal et al. discussed above) Holcomb et al. teach that cobalt is a high purity metal that can be used for a sputtering target. (See Holcomb et al. [0009])

The motivation for utilizing a cobalt target is that it allows deposition of cobalt layer on a substrate. (See Holcomb et al. [0003])

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Segal et al. by utilizing a cobalt target as taught by Holcomb et al. because it allows for deposition of a cobalt layer on a substrate.

Claims 25, 26 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segal et al in view of Raaijmakers et al. and further in view of Lupton et al. (US PGPUB 2002/0096430).

The differences not yet discussed are the recycling of the target (Claim 25) and the melting down of the spent monolithic target for recycling (Claim 26, 39)

Regarding claims 25, 26, 39, Lupton et al. teach recycling targets by melting the used target and reusing it. [0005]

The motivation for recycling the target by melting it down and reusing the material is that it allows for saving on expense of target material. [0005]

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Segal et al. by recycling the target material by melting it down for reuse as taught by Lupton et al. because it allows for saving on expense of target material.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Segal et al in view of Raaijmakers et al. and further in view of Aimone et al. as applied to claims

1, 2, 3, 5, 6, 8-16, 18, 19, 21, 22, 23, 25, 27, 28, 32, 34, 35 and 36 above, and further in view of Lupton et al. (US PGPUB 2002/0096430).

The difference not yet discussed is utilizing flame spraying to recycle the target. (Claim 39)

Regarding claim 39, Aimone et al. teach replacing eroded regions with material through melting. (See Aimone et al. discussed above) Lupton et al. teach flame spraying to coat regions and utilizing the flame sprayed material for sputtering. (See Lupton et al. [0005]) Therefore when Aimone et al. and Lupton et al. are taken as a whole it would suggest flame spraying to cover eroded regions for sputtering.

The motivation for utilizing flame spraying for producing a sputtering target is that it allows for recycling the target. (Lupton et al. [0005])

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized flame spraying to produce sputtered material as taught by Lupton et al. because it allows for recycling eroded regions.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Segal et al. (U.S. Pat. 6,878,250) in view of Raaijmakers et al. (U.S. Pat. 6,340,415) and further in view of Jepson et al. (US PGPUB 2002/0112789).

Segal et al. in view of Raaijmakers et al. is discussed above and all is as applies above. (See Segal et al. in view of Raaijmakers et al. discussed above)

The difference not yet discussed is where a (100) texture is on the surface or throughout the metal.

Jepson et al. is discussed above and teach a target where a (100) texture can be throughout the metal. (See Jepson et al. discussed above)

The motivation for utilizing a target with a (100) texture is that it allows for improving sputtering performance. (See Jepson et al. Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Segal et al. by utilizing a target with a (100) texture throughout it's surface as taught by Jepson et al. because it allows for improving sputtering performance.

Claims 37, 38, 40, 41, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jepson et al. (US PGPUB 2002/0112789) in view of Raaijmakers et al. (U.S. Pat. 6,340,415).

Regarding claim 37, Jepson et al. teach a monolithic sputtering target assembly comprising a one piece assembly made from the same metal. (See Abstract; Fig. 1 Final product) The target plate can be produced to have a predominant (111) texture across the surface when the target plate is less than 0.5 inches. The (100) texture can be mixed in. (See [0039]) The target also is without texture banding. (See [0032] and [0039])

Regarding claim 38, Jepson et al. teach a monolithic sputtering target assembly comprising a one piece assembly made from the same metal. (See Abstract; Fig. 1 Final product) The target plate can be produced to have a predominant (100) texture across the surface when the target plate is least a 0.5 inch or greater. The (111) texture

can be mixed in. (See [0039]) The target also is without texture banding. (See [0032] and [0039])

Regarding claims 40 and 42, the target can be tantalum. (See Abstract; Claims 4 and 5)

Regarding claims 41 and 43, the target can be niobium. (See Abstract; Claims 6 and 7)

The difference between the present claims and Jepson et al. is that the heat sink configuration on an underneath side f the monolithic sputtering target assembly is not discussed.

Raaijmakers et al. teach that a on the back of a target a plurality of grooves can be provided for providing cooling. (Column 3 lines 52-68; Column 4 lines 1-6)

The motivation for utilizing grooves on the back of a sputtering target is that it allows for providing cooling to the target. (Column 3 lines 52-68; Column 4 lines 1-6)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Jepson et al. by utilizing a heat sink configuration as taught by Raaijmakers et al. because it allows for cooling the target.

Response to Arguments

Applicant's arguments filed March 13, 2006 have been fully considered but they are not persuasive.

In response to the argument that Segal et al. do not teach the existence of a backing plate, it is argued that Segal et al.'s back portion is considered to be the

backing plate portion which is the same as Applicant's backing plate feature as shown in Applicant's Figs. 1-3. (See Segal et al. discussed above)

In response to the argument that Segal et al. do not teach the heat sink configuration, it is argued that Raaijmakers et al. teach providing grooves in a target that would provided cooling. Segal et al. recognize cooling in Fig. 3A. (See Raaijmakers et al. and Segal et al. discussed above)

In response to the argument that Segal et al. do not teach the flange portion, it is argued that in Fig. 3A Segal et al. clearly show a flange area. (See Segal et al. Fig. 3A)

In response to the argument that Jepson et al. do not teach a monolithic target, it is argued that Jepson et al. target 42 is considered by the Examiner to be a one piece target. The metal blank 42 is considered to be a one piece target by itself. (See Jepson et al. discussed above)

In response to the argument that Jepson et al. do not teach a heat sink assembly, it is argued that Raaijmakers et al. teach providing grooves for providing a heat sink in a target. (See Raaijmakers et al. discussed above)

In response to the argument that Aimone et al. do not relate to monolithic sputtering target assemblies and therefore would not be applicable for recycling targets, it is argued that Aimone et al. would be applicable since the process relates to recycling targets. (See Aimone et al. discussed above)

In response to the argument that Holcomb et al. is not applicable for the same reasons that Segal et al. is not applicable, it is argued that Segal et al. and Holcomb et

al. are applicable based on the reasons discussed above. (See Segal et al. and Holcomb et al. discussed above)

In response to the argument that Lupton et al. is not applicable because it's design and shape is different than Segal et al., it is argued that the process would be applicable regardless of the design and shape of the target. (See Lupton et al. and Segal et al. discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

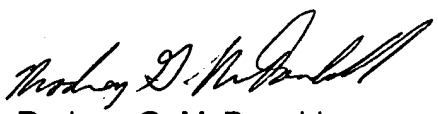
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
May 15, 2006